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SAP Replication Server® Data Assurance Option 15.7.1 SP204
Document Version: 1.0 (2014-12-18)

New Features Guide

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1 New Features in SAP Replication Server Data Assurance 15.7.1 SP204

In SAP® Replication Server® Data Assurance Option 15.7.1 SP204, you can use new options to make heterogeneous datatype comparisons for values that are translated into different datatypes during replication; control scale values for comparing floating point numbers at the comparison and column levels; run the Data Assurance server or agent as a Windows service; and filter out table name prefixes when matching source and target tables for a compareset.

1.1 Comparison and Column Options in SAP DA

Review the comparison and column options added in SAP Replication Server Data Assurance Option (SAP DA) version 15.7.1 SP 204.

1.1.1 Comparison Options

In SAP Replication Server Data Assurance Option (SAP DA) version 15.7.1 SP 204, you can configure a comparison using new date, time, and timestamp formats, as well as new trailing space, trailing padding, and scale options.

Table 1: Comparison Options in DA

Name	Description
FORMAT_BYTES	Indicates how a binary value should be converted into a character value (when it is compared with a character value). When FORMAT_BYTES is HEX_STRING the bytes are converted into a hexa-decimal string. When the FORMAT_BYTES is a character set name (for example UTF8), a byte-to-char conversion is performed. Valid values: HEX_STRING or a character set name Default: HEX_STRING

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Name	Description
FORMAT_DATE	Indicates how a character value should be converted into a date value (when it is compared with a date value). Character values are converted into date objects using `java.text.SimpleDateFormat`. Valid values: any `java.text.SimpleDateFormat` pattern Default: yyyy-MM-dd
FORMAT_TIME	Indicates how a character value should be converted into a time value (when it is compared with a time value). Character values are converted into time objects using `java.text.SimpleDateFormat`. Valid values: any `java.text.SimpleDateFormat` pattern. Default: HH:mm:ss.SSS
FORMAT_TIMESTAMP	Indicates how a character value should be converted into a timestamp value (when it is compared with a timestamp value). Character values are converted into timestamp objects using `java.text.SimpleDateFormat`. Valid values: any `java.text.SimpleDateFormat` pattern. Default: yyyy-MM-dd HH:mm:ss.SSS
IGNORE_TRAILING_SPACES	Whether one or more trailing space (0x20) characters should be ignored when comparing two character values. **Note** if a character value consists entirely of one or more space characters, it will be compared as if it is a single space character (comparing it as an empty string could lead to sorting errors). Valid values: true or false Default: true
IGNORE_ZERO_PADDING	Whether one or more trailing pad bytes (0x00) should be ignored when comparing two binary values. Valid values: true or false Default: true

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Name	Description
SCALE	Specifies the maximum number of scale digits (digits to the right of the decimal point) in a number that is compared. If a number's scale is greater than the SCALE option value, its scale is rounded up to match the number of digits in the SCALE value. For example, when the SCALE value is 3, DA rounds 1.0017 up to 1.002. If you want: • 1.002 to equal 1.0017, set the scale rounding to 3 or lower. • -467.84921 to equal -467.849207, set the scale rounding to 5 or lower. • 98.1 to equal 98.2, set the scale rounding to 0 Any negative value disables this option and DA compares all numbers as is. Valid values: -2147483648 to 2147483647 Default: 10

1.1.1.1 Date, Time and Timestamp Formats

The date, time and timestamp parsing and formatting are performed by the `java.text.SimpleDateFormat` class.

For more information about date and time formats, see the Java API documentation.

1.1.1.2 Supported SAP Replication Server (SRS) Column Level Translations

SAP Replication Server (SRS) supports numerous column-level translations.

The DA comparison options FORMAT_DATE, FORMAT_TIME and FORMAT_TIMESTAMP (and the column option FORMAT) enable DA to support SAP Replication Server (SRS) environments when SRS column-level translations are happening. Column-level translations happen when primary table column values are changed into a different datatypes as they are replicated.

Table 2: Datatype Conversion at Column Level

Supported Datatype Conversion	Description
INT to VARBINARY	SRS converts 1234 into 0xD204. By default, DA converts VARBINARY values into INT values by reversing this RS conversion.
REAL to VARCHAR	SRS converts 123.456 into “123.456”. By default, DA converts VARCHAR values into REAL values by reversing this SRS conversion (this is performed automatically in DA).
VARBINARY to VARCHAR	SRS converts 0x616263 into “616263”. By default, DA converts VARBINARY values into VARCHAR values by reversing this SRS conversion.

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Supported Datatype Conversion	Description
DATE to VARCHAR	SRS converts date values into date strings such as “Oct 20 1972”. This is not the DA default DATE pattern. You must use the following `java.text.SimpleDateFormat` pattern in the FORMAT_DATE comparison or column FORMAT options: MMM d yyyy
TIME to VARCHAR	SRS converts time values into time strings such as “01:05:51:976PM”. This is not the DA default TIME pattern. You must use the following `java.text.SimpleDateFormat` pattern in the FORMAT_TIME comparison or FORMAT column options: hh:mm:ss:SSSaa
DATETIME to VARCHAR	SRS converts datetime values into datetime strings such as “Oct 20 1972 01:05:51:976PM”. This is not the DA default TIMESTAMP pattern. You must use the following `java.text.SimpleDateFormat` pattern in the comparison FORMAT_TIMESTAMP or column FORMAT options: MMM d yyyy hh:mm:ss:SSSaa

1.1.2 Column Options

SAP Replication Server Data Assurance Option (SAP DA) version 15.7.1 SP204 introduces four new optional column options.

The new options override comparison options with the same (or similar) names. These options can also be used to infer additional type information to the agent hash and external sort.

Unlike all other configurations, these options are not required to be set and have no defaults.

Table 3: Optional Column Options in DA

Name	Description
FORMAT	Overrides a Comparison format. If not set, the Comparison formats are used as required. Valid values: Any valid FORMAT_BYTES, FORMAT_DATE, FORMAT_TIME or FORMAT_TIMESTAMP value Default: N/A
IGNORE_TRAILING_SPACES	Overrides the Comparison option with the same name. If not set, the Comparison option is used as required. Valid values: true or false Default: N/A

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Name	Description
IGNORE_ZERO_PADDING	Overrides the Comparison option with the same name. If not set, the Comparison option is used as required. Valid values: true or false Default: N/A
SCALE	Overrides the Comparison option with the same name. If not set, the Comparison option is used as required. Valid values: -2147483648 to 2147483647 Default: N/A.

1.1.2.1 Examples

Replication Server supports column-level translations, which can change column value data types as they are replicated.

For example, DATE data types in the primary table might be inserted into the replicate as VARCHAR (date strings).

Review the sample code that shows how Data Assurance(DA) can compare DATE to VARCHAR using the Column FORMAT option.

The primary (source) table is defined as:

```
 create table tab (id int, a_date date)
```

The replicate (target) table is defined as:

```
create table tab (id int, a_varchar varchar(50))
```

Replication Server is configured to translate DATE values thus:

```
{2014-02-14} -> '2014 Feb 14'
```

Assuming the appropriate DA connections have already been configured, the DA compareset, comparison and job objects can be configured thus:

```
create compareset cs1
  with source conn1 dbo tab s
       target conn2 dbo tab t
  map s.id     = t.id set key=1
  and s.a_date = t.a_varchar
go
create job job1
  add comparison cmpson1
    set compareset cs1
  with column option
    set a_date "compare_mode literal, format 'yyyy MMM dd'"
go
```


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When the job is run and DA compares a DATE with a VARCHAR, DA uses the FORMAT to parse the VARCHAR value to a DATE prior to performing the comparison.

The Comparison FORMAT_DATE can be used in a similar way:

```
create job job2
  add comparison cmpson2
       set compareset   cs1
   and set format_date 'yyyy MMM dd'
go
```

Both techniques have advantages and disadvantages:

- The Comparison FORMAT_DATE option is easier to configure and will apply to all columns that require VARCHAR to DATE conversions. However, because it is generic it cannot be applied during hashing and sorting. This is suitable for LITERAL comparisons of non-key column values only.
- The Column FORMAT option must be applied to each column that requires it (more configurations required). However, because it is specific to a column it works well with hashing and sorting. Use this when the Comparison FORMAT_DATE is not appropriate.

1.2 Support for Scale Rounding at the Comparison and Column Levels

In SAP Replication Server Data Assurance Option (SAP DA) version 15.7.1 SP204, all scale values are now at the COMPARISON and/or COLUMN level.

The new COMPARISON SCALE option sets the scale value. SAP DA uses this value when comparing two floating point numbers. You can override this at the column level by setting the new COLUMN SCALE option.

From version SP204, SAP DA no longer supports the COMPARER_SCALE_ROUNDING parameter. If you do not explicitly set a COMPARISON SCALE when you create a job, DA automatically sets COMPARISON SCALE to the value of the new configuration property DEFAULT_COMPARISON_SCALE.

> **Note**
>
> You can change the COMPARISON SCALE and COLUMN SCALE at any time using the ALTER JOB command.

1.3 Run Data Assurance as a Windows Service

Configure an SAP Replication Server Data Assurance server or agent to run as a service in 64-bit Windows. Once the Windows service is configured, you can start, stop, troubleshoot, or remove it.

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1.3.1 Adding a DA Windows Service

Set up an instance of an SAP Replication Server Data Assurance Option server or agent to run as a service in 64-bit versions of Windows.

Prerequisites

- Create a DA server or agent in a 64-bit version of Windows.
- To use the `ServiceAdmin` utility, install the Visual C++ Redistributable Packages for Visual Studio 2013. Download the packages from http://www.microsoft.com/en-us/download/details.aspx?id=40784. If the packages are not installed, `ServiceAdmin` fails with this error: `Missing Library Dependencies for ServiceAPI.dll, Check That the Library Exists and the Microsoft Visual C Runtime Redistributables is Installed.`

Context

When you create a Windows service to run an instance of a DA server or agent, DA names the service automatically by prefixing the instance name with "DA_Server_" or "DA_Agent_", as appropriate. If you have more than one DA installation on the same machine and they use the same instance name, any Windows allows you to create a service for only one of those instances. If you put multiple DA installations on one machine, use different instance names.

> **Note**
>
> A Windows service has both a service name (for example, DA_Server_myserver) and a display name (SAP Data Assurance Server for myserver). The display name appears in the Windows Services list. It is the service name that must be unique on each machine (though in practice both names will be unique as they must be based on a unique instance name).

Procedure

1. In the Windows Start menu, right-click *Command Prompt* and select *Run as administrator*.

   Even if you already have administrative privileges, this step is required to give the DA Windows service administration tool the permissions it needs to create a Windows service.
2. Change directories:

   ```
   > cd $SAP\DA-15_5\winservice\bin
   ```
3. Run `ServiceAdmin.cmd` to launch the DA Windows service administration tool.

   A new command prompt appears.

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4. (Optional) Enter `help` to see a list of commands available in the service administration tool.

```
Enter a Command:

:> help
Supported Commands Are:
        AddService
        ListService
        RemoveService
        StartService
        StopService
        quit
        setdebug
Type 'help <command>' for Usage

:>
```

5. To create the service, run the `AddService` command with the full path to the DA server or agent instance whose Windows service you are adding.

   For example, to add a Windows service for a DA server called myserver:

   ```
   > AddService C:\SAP\DA-15_5\server\myserver\
   ```

   To add a Windows service for a DA agent called myagent:

   ```
   > AddService C:\SAP\DA-15_5\agent\myagent\
   ```

Next Steps

Start the server or agent instance by starting its new Windows service. [page 12]

1.3.2 Removing a DA Windows Service

Delete the Windows service that runs an SAP Replication Server Data Assurance server or agent.

Prerequisites

A Windows service for a DA server or agent has been created.

Procedure

1. In the Windows Start menu, right-click *Command Prompt* and select *Run as administrator*.

   Even if you already have administrative privileges, this step is required to give the DA Windows service administration tool the permissions it needs to remove a Windows service.

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2. Change directories:

```
> cd $SAP\DA-15_5\winservice\bin
```

3. Run `ServiceAdmin.cmd` to launch the DA Windows service administration tool.

   A new command prompt appears.

4. Run the `RemoveService` command with the full path to the DA server or agent instance whose Windows service you are removing.

   For example, to remove a Windows service for a DA server called myserver:

```
> RemoveService C:\SAP\DA-15_5\server\myserver\
```

   To remove a Windows service for a DA agent called myagent:

```
> RemoveService C:\SAP\DA-15_5\agent\myagent\
```

Results

The command removes the Windows service immediately if it is not running. If the service is running, Windows removes it as soon as it stops.

1.3.3 Starting and Stopping a DA Windows Service

Launch or shut down a Windows service that runs an SAP Replication Server Data Assurance server or agent.

Prerequisites

DA Windows services run as Local System. You need permissions that allow you to start and stop services belonging to Local System. If you can start and stop other services, expect to be able to start and stop DA services too. However, if you encounter an authorization problem, launch a command prompt using the *Run as administrator* option.

Procedure

1. Launch a command prompt and change directories:

```
> cd $SAP\DA-15_5\winservice\bin
```

2. Run `ServiceAdmin.cmd` to launch the DA Windows service administration tool.

   A new command prompt appears.

3. To start a DA server or agent, use the `StartService` command to launch its Windows service.

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For example, to start a DA server called myserver, enter the command and the full path to the server instance:

```
> StartService C:\SAP\DA-15_5\server\myserver\
```

To start a DA agent called myagent, enter the command and the full path to the agent instance:

```
> StartService C:\SAP\DA-15_5\agent\myagent\
```

4. To stop a DA server or agent, use the `StopService` command to shut down its Windows service.

   For example, to stop a DA server called myserver, enter the command and the full path to the server instance:

   ```
   > StopService C:\SAP\DA-15_5\server\myserver\
   ```

   To stop a DA agent called myagent, enter the command and the full path to the agent instance:

   ```
   > StopService C:\SAP\DA-15_5\agent\myagent\
   ```

1.3.4 Troubleshooting a DA Windows Service

Resolve problems affecting an SAP Replication Server Data Assurance Windows service.

Windows Service Logs

Each DA Windows service has its own log file. The log records the Windows service's starts, stops, and errors.

The location of the log file is set in the DA instance's `_Service.ini` initialization file, which resides in the DA instance directory. (For details, see _Service.ini Initialization Files [page 14].)

For example:

```
serviceLog=C:\SAP\DA-15_5\server\myserver\log\WindowsService.log
```

The default log location is `<instance-directory>\log\WindowsService.log`.

The Windows service log may require maintenance as it does not roll over to a new file if the current file grows above a given size.

DA Windows Services Use a Shared JVM DLL

DA Windows services use the JVM DLL in the shared SAP JRE. Each service's `_Service.ini` file points to the JVM DLL. For example:

```
[JavaOptions]
jvmDLL=C:\SAP\Shared\SAPJRE-7_1_015_64BIT\bin\server\jvm.dll
```


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If another SAP product updates the shared SAP JRE (during installation or upgrade, for example), the JVM DLL that a given DA Windows service relies on might be deleted. When this happens, the DA Windows service and its server or agent cannot start.

If an update to the shared SAP JRE renders your DA Windows service unable to start, locate the `jvm.dll` file in the new JRE and update the path in the Windows service's `_Service.ini` file. For details on `_Service.ini` files, see _Service.ini Initialization Files [page 14].

Set JVM Options Both in Run Script and in Service.ini File

The start options for a DA server or agent instance's Java virtual machine are stored in its RUN script. However, an instance that has a Windows service loads JVM options from its `_Service.ini` file. If you modify JVM options for a DA server or agent configured to run as a Windows service, be sure to update both the RUN script and the `_Service.ini` file for the instance. For details on `_Service.ini` files, see _Service.ini Initialization Files [page 14].

Adding or Updating JDBC JAR Files

When you add or update JDBC JARs, or any non-system JAR files, copy them into the `lib` directory for each DA server or agent instance that runs as a Windows service:

- `C:\SAP\DA-15_5\server\lib`, or
- `C:\SAP\DA-15_5\agent\lib`

This is necessary because running DA servers and agents as Windows services relies on the Java classpath, which does not support wildcards. Rather than requiring classpath modifications every time a non-system JAR is added or updated, DA loads all non-system JARs from the appropriate `lib` directory. When you add a JAR to the `lib` directory, stop and restart the DA instance to force it to read the new JAR.

_Service.ini Initialization Files

Each DA Windows service has an initialization file that specifies:

- Start options for the server or agent instance's Java virtual machine.
- The location of the JVM DLL file in the shared SAP JRE. (The shared JRE is used by the JVM and may be used by other SAP software installed on this machine.)
- The location of the service's log file

The initialization file resides in the DA instance directory and is named as follows:

- For a DA server instance: `DA_Server_<instanceName>_Service.ini`
- For a DA agent instance: `DA_Agent_<instanceName>_Service.ini`

For example, the `_Service.ini` files for a server called myserver and an agent called myagent might be:

`C:\SAP\DA-15_5\server\myserver\DA_Server_myserver_Service.ini`

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```
C:\SAP\DA-15_5\agent\myagent\DA_Agent_myagent_Service.ini
```

1.4 Test connection Displays JDBC Driver and Database Versions

The `test connection` command has been enhanced to return the versions of the connection's JDBC driver and the data server (database).

For example:

```
test connection my_hanadb
go

 RESULT
 ----------
 Succeeded

 COMPONENT   VERSION
 ----------- ------------------
 JDBC Driver HDB 1.0
 Data Server HDB 1.00.37.368807
```

1.5 create compareset foreach Can Ignore Table Name Prefixes

The `create compareset foreach` command has a new option, `ignore_prefix`, that lets you specify a table name prefix that should be ignored when matching primary and target tables.

For example, suppose you have a source table named MYTABLE and it has a target table named COPY_OF_MYTABLE. When you use `create compareset foreach`, SAP Replication Server Data Assurance Option cannot automatically match MYTABLE and COPY_OF_MYTABLE. Now, when you create a compareset, you can identify a table prefix for DA to ignore, which allows DA to properly match primary and target tables.

> **Note**
>
> The prefix of a table name is different from the prefix you can set on compareset names.

An updated reference topic for `create compareset foreach` follows; it includes the new `ignore_prefix` option and the parameter that goes with it, **`<table_name_prefix>`**.

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1.5.1 create compareset foreach

Creates a compareset for each table after searching for all matching table names in the source and target databases.

Syntax

```
create compareset [<compareset_name_prefix>] foreach table
  with
    source <source_connection_name> <owner_name> ["ignore_prefix
<table_name_prefix>"]
    target <target_connection_name> <owner_name> ["ignore_prefix
<table_name_prefix>"]
    [and target <target_connection_name> <owner_name> ["ignore_prefix
<table_name_prefix>"]…]
  [{include | exclude} <table_name_pattern> [and <table_name_pattern>]…]
  [set abort_on_collision [{to|=}] {true|false}
    | commit_batch_size [{to|=}] <number_of_comparesets>
    | strict_all_columns [{to|=}] {true|false}
    | strict_column_keys [{to|=}] {true|false}
    | strict_column_types [{to|=}] {true|false}
    | keep_computed_columns [{to|=}] {true|false}
    | keep_encrypted_columns [{to|=}] {true|false}
    [and]…]
go
```

Parameters

compareset_name_prefix

a string to prefix all compareset names.

source_connection_name

the name of the source database connection.

target_connection_name

the name of the target database connection.

owner_name

the name of the owner of the source and target tables.

table_name_prefix

a table name prefix to be ignored when matching source and target table names. The comparison is case-insensitive. Table name prefixes do not appear in generated compareset names. Use with ignore_prefix.

table_name_pattern

a pattern that table names must match to be included or excluded.

Options

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> **Note**
>
> The source and target **<connection_name>** and **<owner_name>** pairings must be unique within each command.

Table 4: create compareset Options

Parameter	Value
ignore_prefix	Causes the command to exclude the specified table name prefix when matching source and target tables. Use with **<table_name_prefix>**.
abort_on_collision	A compareset name generated during the execution of this command might match an existing compareset name (either created manually or through an earlier invocation of this command). When this parameter is set to true and a generated compareset name matches an existing compareset name, the command aborts immediately and all uncommitted comparesets are discarded. Valid values: true or false Default: true
commit_batch_size	The number of comparesets DA server stores in memory before committing them to the internal database. If an error is generated, all uncommitted comparesets are discarded. Valid values: 1 to 2147483647 Default: 1000
strict_all_columns	When this parameter is set to true and one of the target tables does not contain all of the source columns, no compareset is generated. Valid values: true or false Default value: false
strict_column_keys	When this parameter is set to true and one of the source tables has no primary key, identity or uniquely indexed column, no compareset is generated. Valid values: true or false Default: false
strict_column_types	When this parameter is set to true and any target column type does not exactly match the source column type, no compareset is generated. Valid values: true or false Default: false

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Parameter	Value
keep_computed_columns	Whether to include computed columns in the compareset column mappings. Valid values: true or false Default: false
keep_encrypted_columns	Whether to include encrypted columns in the compareset column mappings. Valid values: true or false Default: false

Examples

Example 1

Creates a compareset for each table that exists in both the source and target databases for DA connections "conn_venus" and "conn_pluto" respectively. Each compareset name uses the default prefix:

```
create compareset foreach table
  with source conn_venus dbo
       target conn_pluto dbo
go
```

Example 2

Creates a compareset for each table that exists in both the source and target databases using the prefix "cmpset_", excluding the SAP Replication Server tables, which have names that are prefixed with "rs_":

```
create compareset cmpset_ foreach table
  with source conn_venus dbo
       target conn_pluto dbo
  exclude rs_*
go
```

Example 3

Creates a compareset for each table that exists in both the source and target databases using the prefix "cmpset_" excluding SAP Replication Server tables. The command does not abort if a compareset is generated with the same name as one that already exists and buffered comparesets are committed to the DASD in batches of 100:

```
create compareset cmpset_ foreach table
  with source conn_venus dbo
       target conn_pluto dbo
  exclude rs_*
  set abort_on_collision false
    and set commit_batch_size 100
go
```


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Example 4

Creates a compareset for each table that exists in the source and both target databases using the default prefix, including tables only with names that begin with the prefix "`customer_`" or "`cust_`". Each target table must contain all the source table columns with the same name, type, precision, and scale:

```
create compareset foreach table
  with source conn_venus dbo
       target conn_pluto dbo
   and target conn_earth dbo
  include customer_*
      and cust_*
  set strict_all_columns true
    and set strict_column_types true
go
```

Example 5

Creates a compareset using tables whose names begin with "abc" in the source, conn_venus, and the target, conn_pluto—but ignores the table name prefix copy_of_. For example, if the source includes table abcdef and the target includes table copy_of_abcdef, this command uses the two tables to create compareset cs_abcdef.

```
create compareset cs_ foreach table
  with source conn_venus dbo
       target conn_pluto dbo "ignore_prefix copy_of_"
  include abc*
go
```

Usage

- When overriding the default compareset prefix:
  - The compareset name prefix cannot begin with a digit.
  - Do not create unnecessary duplicate comparesets.

    > **Note**
    >
    > DA creates duplicate comparesets if you run `create compareset foreach` multiple times with different prefixes.
- The prefix that might be present in a target table name is different from the prefix you can set on compareset names.
- You can use wildcards in the **`<table_name_pattern>`**. For example:
  - include a* and b* – includes all table names beginning with `a` or `b` only.
  - exclude *_???– excludes all table names that end with an underscore followed by any three characters, such as `table_001` and `table_002`.

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2 New Features in SAP Replication Server Data Assurance 15.7.1 SP202

SAP® Replication Server® Data Assurance Option 15.7.1 SP202 supports specifying the order of compareset key columns in `order by` clauses, introduces a comparison option for ignoring trailing spaces in character columns, allows you to direct job output to a directory of your choice, and introduces the with map option for compareset commands.

2.1 Support for Sorting Key Columns in the Index Order

In SAP Replication Server Data Assurance Option (SAP DA) version 15.7.1 SP202, the `create compareset` and `alter compareset` commands allow you to specify the order of compareset key columns in `order by` clauses using an ordinal integer number in addition to a Boolean value.

Valid values for setting compareset key columns are:

- An integer value ranging from 1 to 2147483647 or 0 to indicate not a key column
- True or false

> **Note**
>
> SAP DA interprets true as 1 or greater, and false as zero (0).

Each key column must be a unique ordinal number within in the compareset. When a compareset has multiple key columns, ordinal integer numbers are used to decide the order of the keys in the `order by` clause. The `order by` clause is included in the select statement, which SAP DA issues to the source and target data servers when selecting data to compare.

For example, when you compare an existing `person` table with these key columns:

```
create table person (
  first_name varchar(50),
  last_name  varchar(50),
  dob        datetime,
  primary key(last_name, first_name)
)
```

The primary keys places the `last_name` column ahead of the `first_name` column, and the data server is optimized for sorting and retrieving rows in this order. A compareset can be created to select the rows in the optimal order:

```
create compareset person
with source conn1 dbo person s
target conn2 dbo person t
map s.first_name = t.first_name set key = 2
and s.last_name = t.last_name set key = 1
and s.dob = t.dob
go
```


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When SAP DA selects rows from the "person" table for a comparison, this SQL query is generated:

```
select first_name,last_name,dob from dbo.person order by last_name,first_name
```

When you run the `create compareset` command with the map all parameter, SAP DA sets the compareset key column ordinal numbers in the optimal order itself.

The `pkey` column is renamed to `key` and `Y/N` values are replaced with numbers in the `show compareset` command output:

```
show compareset person columns
go

 TYPE CONNECTION OWNER TABLE  MAPID COLUMN     KEY
 ---- ---------- ----- ------ ----- ---------- ----
 S    conn1      dbo   person 1     first_name 2
 T    conn2      dbo   person 1     first_name 2
 S    conn1      dbo   person 2     last_name  1
 T    conn2      dbo   person 2     last_name  1
 S    conn1      dbo   person 3     dob
 T    conn2      dbo   person 3     dob
```

See *Compareset Commands* in the *SAP Replication Server Data Assurance Option Users Guide*.

2.2 Ignore Trailing Spaces in Job Comparisons

Use the ignore_trailing_spaces new comparison option in the `create job`, `replace job`, and `alter job` commands for ignoring trailing spaces when comparing character datatypes. When the ignore_trailing_spaces is true, SAP DA considers "abc" and "abc " values as equal.

Character datatypes include:

- `CHAR`
- `NCHAR`
- `VARCHAR`
- `NVARCHAR`
- `TEXT`
- `NTEXT`
- `CLOB`
- `NCLOB`

The space character is a Unicode value of '`space`', U+0020.

> **Note**
>
> Trailing spaces are retained during reconciliation and reporting.

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New Parameter:

ignore_trailing_spaces – Determines whether to ignore trailing spaces when comparing character datatype values.

Valid values are:

- true – (default) ignores trailing spaces when comparing character datatype values.
- false – does not ignore trailing spaces when comparing character datatype values.

For example, create a job named "`person_job`":

```
create job person_job
add comparison person_cmpson
  set compareset=person_cmpset and
  set ignore_trailing_spaces=true
go
```

See *Row Comparison Job Commands* in the *SAP Replication Server Data Assurance Option Users Guide*.

2.3 Redirect Output to a Specific Directory Using the Configuration File

Use the `instance.cfg` configuration file to redirect the output to an alternate directory for storing potentially large reports and reconciliation scripts.

The `instance.cfg` file for SAP DA is found in the default installation directory.

- SAP DA agent:
  - On Windows – `%SAP%\DA-15_5\agent\<instance>`
  - On UNIX – `$SAP/DA-15_5/agent/<instance>`
- SAP DA server:
  - Windows – `%SAP%\DA-15_5\server\<instance>`
  - UNIX – `$SAP/DA-15_5/server/<instance>`

where **<instance>** is the name of your SAP DA agent or server.

To redirect the output to a specific directory, open the `instance.cfg` configuration file, and modify the da.data.dir parameter to an alternate directory. For example:

```
da.data.dir=${data.instance.dir}/data
```

to

```
da.data.dir=C:/anywhere/server/<instance>/data
```

> **Note**
>
> The default data directory is authenticated with SAP DA security settings. Change the data directory only when you can secure the data, and potentially large reports and reconciliation scripts are generated.

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See *Security and Access Control* in the *SAP Replication Server Data Assurance Option Users Guide*.

2.4 Automatic Column Key Assignment for User Defined Compareset Column Mappings

In version 15.7.1 SP202, SAP DA can assign key columns automatically for a compareset with user-defined column mappings.

Use the new with map option to map columns in a compareset when there are no key columns.

> **Note**
>
> You can set the with map option only for the strict_key parameter in the `create compareset` or `replace compareset` command.

When there are no key columns assigned in the compareset, SAP DA searches for any of these:

- Primary key columns. If a primary key is found, SAP DA sets it as a key.
- Identity columns. If an identity column is found, SAP DA sets it as a key.
- Unique index columns. If a uniquely indexed column is found, SAP DA sets it as a key.

If no primary key, identity or unique index columns are found and when the:

- strict_key parameter is false (default setting), SAP DA uses all columns as the key.
- strict_key parameter is true, SAP DA will not create the compareset and the "`no key found`" error message is displayed.

Set the strict_key parameter using an optional with map option as:

```
[with map option set strict_key [{to|=}] {true|false}]
```

For example, if you have a source and target table with these columns:

```
create table person (
  first_name varchar(50),
  last_name varchar(50),
  dob datetime,
 primary key(last_name, first_name)
)
```

You can create a compareset without the `set key=true` column option:

```
create compareset person
with source conn1 dbo person s
     target conn2 dbo person t
map s.first_name = t.first_name
and s.last_name = t.last_name
and s.dob = t.dob
with map option set strict_key = true
go
```

SAP DA will assign the column keys:

```
show compareset person columns
go
```


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```
TYPE CONNECTION OWNER TABLE  MAPID COLUMN     KEY
---- ---------- ----- ------ ----- ---------- ----
S    conn1      dbo   person 1     first_name 2
T    conn2      dbo   person 1     first_name 2
S    conn1      dbo   person 2     last_name  1
T    conn2      dbo   person 2     last_name  1
S    conn1      dbo   person 3     dob
T    conn2      dbo   person 3     dob
```


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3 New Features in SAP Replication Server Data Assurance 15.7.1 SP200

SAP® Replication Server® Data Assurance Option 15.7.1 SP200 includes support for all table columns as compareset key columns, and SAP Java Virtual Machine (JVM).

SAP Replication Server Data Assurance Option 15.7.1 SP200 is compatible with the SAP® Control Center for Data Assurance 3.3 plug-in. For more information, see the SAP Control Center for Data Assurance 3.3 documentation.

3.1 Support for All Table Columns as Compareset Key Columns

You can now create comparesets using all non-large object (LOB) columns as compareset keys, when a unique row key column does not exist in the table.

In earlier versions of the SAP Replication Server Data Assurance Option, `create compareset` and `create compareset foreach` commands with map all parameter required primary key, identity, or uniquely indexed columns in the source table to create comparesets. In the version 15.7.1 SP200, when a table does not contain a primary key, identity or uniquely indexed column, the map all parameter uses all non-LOB columns as the compareset key.

If you do not want to create comparesets with non-LOB columns as the compareset key, set:

- strict_key parameter to true in the `create compareset` command
- column_strict_keys parameter to true in the `create compareset foreach` command

When all non-LOB columns are used as compareset keys, the keys might not be unique. To abort a comparison when duplicate row keys are detected, use the abort_dupe_key_immediate parameter in the `create job` and the `alter job`command.

For command syntax and parameter descriptions, see the *SAP Replication Server Data Assurance Option Users Guide*.

3.2 Support for SAP JVM

SAP Replication Server Data Assurance Option 15.7.1 SP200 installer includes the SAP JVM.

For more information about SAP JVM, see the *SAP Help Portal*.

You can modify the DA server `keystore` (flat file) to include the trusted certificate authority (CA).

The list of known and trusted CA certificates are maintained in the `keystore`:

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- On Windows – `keytool -certreq -alias jetty -keystore %SYBASE%\SCC-3_2\services \EmbeddedWebContainer\keystore -file scc_jetty.csr`
- On UNIX – `keytool -certreq -alias jetty -keystore $SYBASE/SCC-3_2/services/ EmbeddedWebContainer/keystore -file scc_jetty.csr`

The `keytool` utility resides in the Java Runtime Environment (JRE) installation directory %SYBASE_JRE7% \bin\keytool (on Windows) and $SYBASE_JRE7/bin/keytool (on UNIX).

The system administrator can add CA certificates to the `keystore` that exists in SAP Control Center, which is in the `$SCC_HOME/services/EmbeddedWebContainer/cacerts` directory. The default password is `changeit`.

By default, DA server recognizes these third-party CA certificates:

- Baltimore Cyber Trust
- Entrust
- Equifax SCA
- GTE Global
- SAP Passport
- Trustcenter
- Telekom
- Thawte
- VeriSign
- Workplace ca

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4 New Features in Replication Server Data Assurance Option 15.7.1 SP110

Replication Server® Data Assurance Option 15.7.1 SP110 includes support for IBM DB2 Universal Database (UDB) and Microsoft SQL Server as either source or target databases, and usability enhancements.

Replication Server Data Assurance Option 15.7.1 SP110 is compatible with the Sybase® Control Center for Data Assurance 3.2.8 SP01 plug-in. See *Sybase Control Center for Data Assurance 3.2.8 SP01 Documentation*.

4.1 Support for IBM DB2 UDB

SAP Replication Server Data Assurance Option 15.7.1 SP110 supports comparisons where the source or target database is IBM DB2 UDB.

You can compare data between any source and target database combinations. For example:

- A homogeneous comparison IBM DB2 UDB to IBM DB2 UDB
- An SAP® Adaptive Server® Enterprise (SAP ASE) source database and an IBM DB2 UDB target database in a heterogeneous comparison
- An Oracle source database with multiple target databases, for example, both SAP Adaptive Server Enterprise and SAP® IQ
- An SAP Adaptive Server Enterprise source database and an SAP HANA® target database

Supported versions:

- IBM DB2 UDB 9.5
- IBM DB2 UDB 9.7
- IBM DB2 UDB 10.1

Data Assurance (DA) does not ship the Java Database Connectivity (JDBC) driver JAR file for IBM DB2 UDB. Download the JDBC type4 driver JAR file from the IBM Web site for your IBM DB2 UDB, and configure DA to use the JDBC driver.

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4.1.1 Configuring DA to Use the IBM DB2 UDB JDBC Driver

To use an IBM DB2 UDB database in a comparison, configure the DA server and the DA agent to use the `db2jcc4.jar` file.

Procedure

1. Download the `db2jcc4.jar` JDBC driver for your database version from the IBM Web site.
2. Copy the `db2jcc4.jar` file into the DA library folder:
   - On Windows – `%SYBASE%\DA-15_5\server\lib\`
   - On UNIX – `$SYBASE/DA-15_5/server/lib/`

   where `%SYBASE%` (Windows) or `$SYBASE` (UNIX) is the directory in which you installed the Data Assurance Option, and `lib` is the library folder of your DA server instance.
3. Restart the DA server for the settings to take effect.

   Follow the same steps to configure a DA agent to use the IBM DB2 UDB JDBC driver JAR file.

4.1.2 Data Comparison Scenario: Adaptive Server to IBM DB2 UDB

Perform a heterogeneous comparison using Adaptive Server and IBM DB2 UDB databases.

Prerequisites

Before starting the DA agent, add the JDBC driver JAR file for an IBM DB2 UDB to the DA classpath.

Context

This example uses a DA server local agent connecting to an Adaptive Server and a DA agent connecting to an IBM DB2 Universal database.

Table 5: Deployment Summary

Component Name	Machine Name	Port Numbers
DA server	mars	• 6500 – RMI • 6501 – TDS • 6503 – DASD

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Component Name	Machine Name	Port Numbers
DA agent	neptune	• 6500 – RMI • 6501 – TDS • 6502 – DTS
Adaptive Server database	mars	5000 – server
IBM DB2 Universal Database	neptune	5001– server

Procedure

1. Start the DA server instance named mars:

   ```
   $SYBASE/DA-15_5/server/<instance>/RUN_<instance>_64.sh
   ```

   where $SYBASE is the directory in which you installed the Data Assurance Option, **<instance>** is the name of your DA server instance, and `RUN_<instance>_64.sh` is the start-up script.

   > **Note**
   >
   > On Windows, the start-up script file is named `RUN_<instance>_32.bat` or `RUN_<instance>_64.bat`. On UNIX or Linux platforms, the file is named `RUN_<instance>_64.sh`.

2. Start the DA agent instance on the machine named neptune:

   ```
   $SYBASE/DA-15_5/agent/<instance>/RUN_<instance>_64.sh
   ```

3. From `isql`, log in to DA server as an administrator:

   ```
   $SYBASE/OCS-15_0/bin/isql -S mars:6501 -U da_admin -P <password> -w 250
   ```

4. Create a DA agent connection that connects to the IBM DB2 Universal Database:

   ```
   create agent agent_neptune
       set host=neptune
       and set port=6500
       and set user=da_admin
       and set password=<password>
   go
   ```

5. View the newly created DA agent:

   ```
   show agent agent_neptune
   go
   ```

6. Test connection settings for the DA agent:

   ```
   test agent agent_neptune
   go
   ```

7. Create database connections for the new DA agent.

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In this example, the `pubs2` database is replicated on the IBM DB2 UDB. The DA server's local agent on `mars` points to the Adaptive Server database on `mars`, while the agent on `neptune` points to the IBM DB2 UDB:

```
create connection conn_mars
    set type=ASE
    and set agent=localagent
    and set host=mars
    and set port=5000
    and set user=sa
    and set database=pubs2
    and set password=<password>
    go
```

```
create connection conn_neptune
   set type=UDB
   and set agent=agent_neptune
   and set host=neptune
   and set port=5001
   and set database=PUBS2
   and set user=JOHN
   and set password=mssqt12
   go
```

8. View the newly created database connections:

```
show connection
go
```

```
show connection conn_mars
go
```

```
show connection conn_neptune
go
```

9. Test the database connections:

```
test connection conn_mars
go
```

```
test connection conn_neptune
go
```

10. Create a compareset to map the entire source table.

    This example compares the Adaptive Server and the IBM DB2 UDB data:

```
create compareset authors_demo4
  with
    source conn_mars dbo authors s
    target conn_netpune DB2INST1 AUTHORS t
  map
    s.au_id=t.AU_ID set key=true
    and s.au_lname=t.AU_LNAME
    and s.au_fname=t.AU_FNAME
    and s.phone=t.PHONE
    and s.address=t.ADDRESS
    and s.city=t.CITY
    and s.state=t.STATE
    and s.country=t.COUNTRY
    and s.postalcode=t.POSTALCODE
go
```


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11. View the compareset:

```
show compareset authors_demo4
go
```

12. Create a job.

    This job creates a single comparison that uses the compareset defined in step 10. It compares all rows in the `authors` table:

```
create job authors_job4
        add comparison cmp_authors4
        set COMPARESET=authors_demo4
        and set NUM_PARTITIONS to 1
        and set ENABLE_ROW_COUNT to false
        and set COMPARE_MODE to row_compare
        and set HASH_TYPE to AGENT_HASH
    go
```

> **Note**
>
> Set the HASH_TYPE comparison option to `agent_hash` for heterogeneous comparison. The `database_hash` comparison option is used only for comparisons between Adaptive Server.

13. Execute the job to compare the data:

```
run job authors_job4
go
```

    DA compares equivalent values stored in distinct datatypes accurately.

4.2 Support for Microsoft SQL Server

Replication Server Data Assurance Option 15.7.1 SP110 supports comparisons where the source or target database is Microsoft SQL Server.

Supported versions:

- Microsoft SQL Server 2008
- Microsoft SQL Server 2008 R2
- Microsoft SQL Server 2012

DA does not ship the JDBC driver JAR file for a Microsoft SQL Server database. Download the JDBC type4 driver JAR file from the Microsoft Web site for your database version, and configure DA to use the JDBC driver.

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4.2.1 Configuring DA to Use the Microsoft SQL Server JDBC Driver

To use a Microsoft SQL Server database in a comparison, configure the DA server and the DA agent to use the `sqljdbc4.jar` file.

Procedure

1. Download the `sqljdbc4.jar` JDBC driver for your database version from the Microsoft Web site.
2. Copy the `sqljdbc4.jar` file into the DA library folder:
   - On Windows – `%SYBASE%\DA-15_5\server\lib\`
   - On UNIX – `$SYBASE/DA-15_5/server/lib/`

   where `%SYBASE%` (Windows) or `$SYBASE` (UNIX) is the directory in which you installed the Data Assurance Option, and `lib` is the library folder of your DA server instance.
3. Restart the DA server for the settings to take effect.

   Follow the same steps to configure a DA agent to use the Microsoft SQL Server JDBC driver JAR file.

4.2.2 Data Comparison Scenario: Adaptive Server to Microsoft SQL Server

Perform a heterogeneous comparison using Adaptive Server and Microsoft SQL Server databases.

Prerequisites

Before starting the DA agent, add the JDBC driver JAR file for a Microsoft SQL Server to the DA classpath.

Context

This example uses a DA server local agent connecting to an Adaptive Server, and a DA agent connecting to a Microsoft SQL Server.

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Table 6: Deployment Summary

Component Name	Machine Name	Port Numbers
DA server	mars	• 6500 – RMI • 6501 – TDS • 6503 – DASD
DA agent	pluto	• 6500 – RMI • 6501 – TDS • 6502 – DTS
Adaptive Server database	mars	5000 – server
Microsoft SQL Server database	pluto	1433 – server

Procedure

1. Start the DA server instance named mars:

   ```
   $SYBASE/DA-15_5/server/<instance>/RUN_<instance>_64.sh
   ```

   where $SYBASE is the directory in which you installed the Data Assurance Option, **<instance>** is the name of your DA server instance, and `RUN_<instance>_64.sh` is the start-up script.

   > **Note**
   >
   > On Windows, the start-up script file is named `RUN_<instance>_32.bat` or `RUN_<instance>_64.bat`. On UNIX or Linux platforms, the file is named `RUN_<instance>_64.sh`.

2. Start the DA agent instance on the machine named pluto:

   ```
   $SYBASE/DA-15_5/agent/<instance>/RUN_<instance>_64.sh
   ```

3. From `isql`, log in to DA server as an administrator:

   ```
   $SYBASE/OCS-15_0/bin/isql -S mars:6501 -U da_admin -P <password> -w 250
   ```

4. Create a DA agent connection that connects to the Microsoft SQL Server:

   ```
   create agent agent_pluto
       set host=pluto
       and set port=6500
       and set user=da_admin
       and set password=<password>
   go
   ```

5. View the newly created DA agent:

   ```
   show agent agent_pluto
   go
   ```


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6. Test connection settings for the DA agent:

```
test agent agent_pluto
go
```

7. Create database connections for the new DA agent.

   In this example, the `pubs2` database is replicated on the Microsoft SQL Server database. The DA server's local agent on `mars` points to the Adaptive Server database on `mars`, while the agent on `pluto` points to the Microsoft SQL Server database:

```
create connection conn_mars
    set type=ASE
    and set agent=localagent
    and set host=mars
    and set port=5000
    and set user=sa
    and set database=pubs2
    and set password=<password>
    go
```

```
create connection conn_pluto
   set type=MSSQL
   and set agent=agent_pluto
   and set host=pluto
   and set port=1433
   and set database=pubs2
   and set user=steve
   and set password=ibmste11
   go
```

8. View the newly created database connections:

```
show connection
go
```

```
show connection conn_mars
go
```

```
show connection conn_pluto
go
```

9. Test the database connections:

```
test connection conn_mars
go
```

```
test connection conn_pluto
go
```

10. Create a compareset to map the entire source table.

    This example compares the Adaptive Server and the Microsoft SQL Server data:

```
create compareset authors_demo4
  with
    source conn_mars dbo authors s
    target conn_pluto dbo authors t
  map
    s.au_id=t.au_id set key=true
    and s.au_lname=t.au_lname
    and s.au_fname=t.au_fname
    and s.phone=t.phone
```


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```
    and s.address=t.address
    and s.city=t.city
    and s.state=t.state
    and s.country=t.country
    and s.postalcode=t.postalcode
go
```

11. View the compareset:

```
show compareset authors_demo4
go
```

12. Create a job.

    This job creates a single comparison that uses the compareset defined in step 10. It compares all rows in the `authors` table:

```
create job authors_job4
        add comparison cmp_authors4
        set COMPARESET=authors_demo4
        and set NUM_PARTITIONS to 1
        and set ENABLE_ROW_COUNT to false
        and set COMPARE_MODE to row_compare
        and set HASH_TYPE to AGENT_HASH
    go
```

> **Note**
>
> Set the HASH_TYPE comparison option to `agent_hash` for heterogeneous comparison. The `database_hash` comparison option is used only for comparisons between Adaptive Server.

13. Execute the job to compare the data:

```
run job authors_job4
go
```

    DA compares equivalent values stored in distinct datatypes accurately.

4.3 Changes to Connection Profile Commands

Replication Server Data Assurance Option 15.7.1 SP110 accepts MSSQL and UDB values in the type parameter, when you create Microsoft SQL Server and IBM DB2 UDB connections using the `create connection` command.

You can also use the type parameter to enter MSSQL and UDB values in the `replace connection` and `test connection config` commands.

As of 15.7.1 SP110, you can specify an optional `sessionTimeZone` property for an Oracle database connection.

This property is used by the Oracle JDBC driver, when comparing `TIMESTAMP WITH LOCAL TIME ZONE` columns. For example:

```
create connection ora_conn1
      set type=ORACLE
  and set agent=agent_jupiter
```


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```
  and set host=jupiter
  and set port=1521
  and set database=XE
  and set user=harry
  and set password=openSesam3
  with properties
       set sessionTimeZone='Europe/London'
go
```

The `sessionTimeZone` property overrides the default value.

See *Replication Server Data Assurance Option Users Guide*.

4.4 Usability Enhancements

Replication Server Data Assurance Option 15.7.1 SP110 includes several changes to improve usability.

4.4.1 Changes to the Run Job Command

To determine whether a job has completed, you can now use the `run job` command with the wait parameter rather than issuing multiple `monitor job` commands.

Earlier versions of DA required you to execute separate commands to run a job and monitor the comparison results. For example:

```
run job myJob
go
```

```
monitor job myJob [myComparison]
go
```

While waiting for DA server to complete the job, you might have had to execute the `monitor` command multiple times.

Now, you can execute a single `run job` command with the wait parameter and view the comparison results immediately when the job completes. For example:

```
run job myJob wait [timeout seconds]
go
```

where:

wait the `isql` prompt does not return until DA server completes the job.

timeout (optional) specifies a value, in seconds, after which you can regain control of the `isql` prompt if, for example, the job is taking too long to complete. Valid values are 1 to 2147483647; if you do not specify a timeout parameter value, the `isql` prompt waits indefinitely.

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Example

Example 1 – waits indefinitely until the job is completed. You cannot regain the `isql` prompt control until DA server completes the job. The job is considered complete when all comparisons run successfully, or if there are errors that abort the job, or if you abort the job manually using a different `isql` prompt:

```
run job myjob wait
go
```

The returned result is:

```
SUBMIT TIME         FINISH TIME         COMPARISONS READ (S) DIFFS M O I R
ERRORS
------------------- ------------------- ----------- -------- ----- - - - -
------
2013-06-27 10:20:51 2013-06-27 10:26:59 1           10000    0     0 0 0 0 0

(0 rows affected)
```

In this example, you regain control of the `isql` prompt after 6 seconds approximately (the difference between the Submit Time and the Finish Time). The job is completed and the output is identical to that of `show history myjob latest summary` command.

Example

Example 2 – waits for 10 seconds before transferring control of the `isql` prompt to you. The job is considered complete when all comparisons run successfully, or if there are errors that abort the job, or if you abort the job manually using a different `isql` prompt:

```
run job myjob wait 10
go
```

The returned result is:

```
SUBMIT TIME         FINISH TIME         COMPARISONS READ (S) DIFFS M O I R
ERRORS
------------------- ------------------- ----------- -------- ----- - - - -
------
2013-06-27 10:31:52 2013-06-27 10:38:02 1           10000    0     0 0 0 0 0

(0 rows affected)
```

In this example, you regain control of the `isql` prompt after 6 seconds approximately (the difference between the Submit Time and the Finish Time). The job is completed and the output is identical to that of `show history myjob latest summary` command.

Example

Example 3 – waits for 5 seconds before transferring control of the `isql` prompt to you. The job is considered complete when comparisons run successfully, or if there are errors that abort the job, or if you abort it manually using a different `isql` prompt:

```
run job myjob wait 5
go
```


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The returned result is:

```
COMPARISON PART STATUS  SUBMIT TIME         END TIME RUN PROGRESS NEXT RETRY
ERROR
---------- ---- ------- ------------------- -------- --- -------- ----------
-----
mycmp      0    RUNNING 2013-06-27 10:49:54          1   89%
[#103] Waited 5 seconds, the job is still running.

(0 rows affected)
```

In this example, you regain control of the `isql` prompt after 5 seconds and the output shows the current 'running' state of the job. The job is still running and the output is identical to that of `monitor job myjob` command.

4.4.2 Changes to the Show History Command

As of Replication Server Data Assurance Option 15.7.1 SP110, the `show history` command no longer shows report files to avoid generating potentially very large report files, when you want to view the history.

In earlier versions of DA, when you executed `show history`, report files were generated along with the history in a potentially large file. For example:

```
show history myJob
go
```

Now, you must execute the `show report` command to view the report files. For example:

```
show report myJob 12
```

```
show report myJob latest
```

4.4.3 Improvements to Large Object Support

In Replication Server Data Assurance Option 15.7.1 SP110, large object (LOB) support is improved, with an increase in the maximum value of the lob_fetch_size parameter, for comparing and reconciling LOBs of greater length.

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4.5 Changes to Sybase Control Center Data Assurance Plug-In

Sybase Control Center Data Assurance plug-in now supports Microsoft SQL Server and IBM DB2 UDB for creating database connections.

See *Document Changes > SCC for Data Assurance Help: New Supported Database Platforms in the Sybase Control Center 3.2.8 ESD #2 Release Bulletin*.

4.5.1 Monitoring and Managing Data Assurance 15.7.1 SP110 Environment

Use Sybase Control Center (SCC) 3.2.8 ESD #2 with SCC for Data Assurance 3.2.8 SP01 to monitor Data Assurance (DA) server, and manage DA agent and database connections.

Context

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5 New Features in Replication Server Data Assurance Option 15.7.1 SP100

Replication Server® Data Assurance Option15.7.1 SP100 includes support for Sybase® IQ, Oracle, and SAP HANA® as either source or target databases, data partitions for large tables, and heterogeneous comparison enhancements.

Replication Server Data Assurance Option 15.7.1 SP100 is compatible with Sybase Control Center 3.2.8. See *Sybase Control Center 3.2.8 for Data Assurance Documentation*.

5.1 Support for Sybase IQ

Replication Server Data Assurance Option 15.7.1 SP100 supports comparisons where the source or target database is Sybase IQ.

Supported versions:

- Sybase IQ 15.4
- Sybase IQ 15.3

The jConnect™ for JDBC™ driver included with DA server and DA agent connects to a Sybase IQ database. No further configuration is required.

See *create connection* in the *Replication Server Data Assurance Option Users Guide*.

5.2 Support for Oracle

Replication Server Data Assurance Option 15.7.1 SP100 supports comparisons where the source or target database is Oracle.

Supported versions:

- Oracle 11g
- Oracle 10g

> **Note**
>
> Data Assurance (DA) does not ship the Java Database Connectivity (JDBC) driver JAR file for an Oracle database. You must configure DA to use the Oracle JDBC driver, which is deployed with your Oracle installation.

See *create connection* and *Configuring DA to Use the Oracle JDBC Driver* in the *Replication Server Data Assurance Option Users Guide*.

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5.3 Support for HANA DB

Replication Server Data Assurance Option 15.7.1 SP100 supports comparisons where the source or target database is HANA DB.

Supported version:

- SAP HANA 1.0

> **Note**
>
> DA does not ship the JDBC driver JAR file for the HANA DB. Download the JDBC type4 driver JAR file from the SAP® Web site for your HANA DB version, and configure DA to use the JDBC driver.

See *create connection* and *Configuring DA to Use the HANA DB JDBC Driver* in the *Replication Server Data Assurance Option Users Guide*.

5.4 Heterogeneous Comparison

Replication Server Data Assurance Option 15.7.1 SP100 compares row data between two or more databases in a heterogeneous comparison environment.

A heterogeneous environment means two or more of the databases in use are from different vendors.

You can compare data between any source and target database combinations. For example:

- An Adaptive Server source database and a Sybase IQ target database
- An Oracle source database with multiple target databases, for example, both Adaptive Server and Sybase IQ.
- An Adaptive Server source database and an HANA target database

DA accurately compares equivalent values stored in distinct datatypes. For example, the value 1 stored in a Sybase IQ `NUMERIC` column is equivalent to the value 1 stored in an Oracle `NUMBER` column, and to 1.0 stored in an `ASE FLOAT` column.

To use heterogeneous comparison:

- Configure DA to use the JDBC drivers for Oracle and HANA DB instances, if your heterogeneous comparison includes these databases.
- Create connections for each new database.
- Set the hash_type comparison option to `agent_hash`.

See *create connection* and *Heterogeneous Comparison Deployment* in the *Replication Server Data Assurance Option Users Guide*.

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5.5 Data Partitions

Replication Server Data Assurance Option 15.7.1 SP100 allows large tables to be split into logical partitions.

For maximum performance, you can run each logical partition in parallel on a database with multiple engines. The data partitions can be run in smaller groups, if DA is configured to run fewer comparisons at the same time.

> **Note**
>
> When you run a comparison with a new compareset for the first time, DA runs the comparison with a single partition to gather partition information for subsequent runs.

The SQL `where` clause on the compareset key columns defines the upper and lower partition boundaries. The boundary key values are sampled for a compareset when a comparison that uses it is run for the first time. These boundary samples are stored in the Data Assurance System Database (DASD).

On subsequent runs, any comparison that uses the same compareset uses those boundary samples to split a table into as many logical partitions as required. Each time a comparison is run, DA collects the new boundary samples for the compareset in use, and updates them in the DASD.

To view and manage the data partitions and boundary samples, use:

- `show boundary` and `drop boundary` commands to view or delete the data partition boundary samples for each compareset.
- NUM_PARTITIONS comparison option to set the number of data partitions for a comparison.
- `PART` column in the `monitor job` and `show job` command's result set to view the data partition number for a comparison.

See *Row Comparison Job Commands* and *Data Partition Commands* in the *Replication Server Data Assurance Users Guide*.

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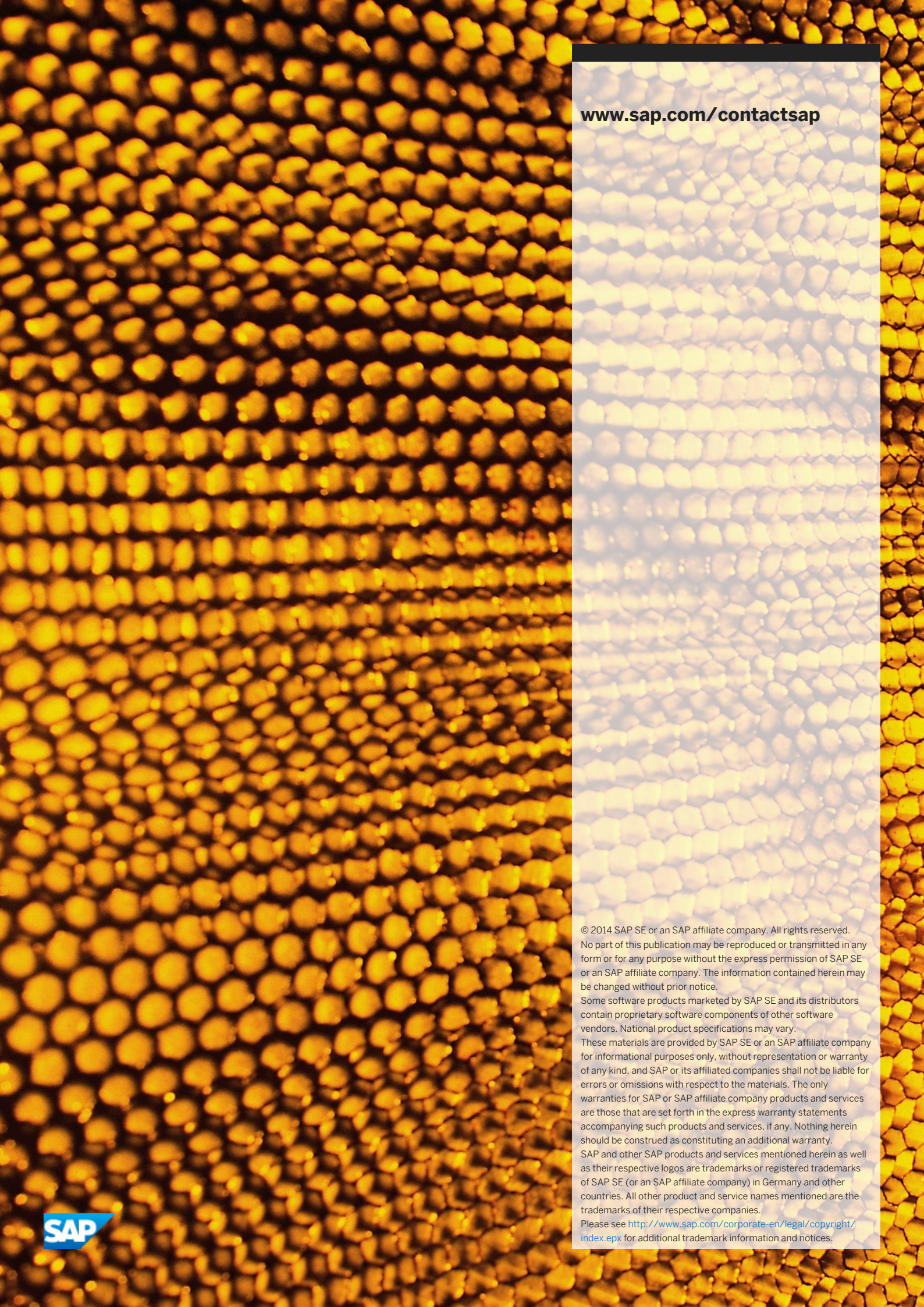

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